Small
Business
Innovation
Research

High Temperature Gallium Nitride-Based Sensors and Electronics

ATMI, Inc.

Danbury, CT

INNOVATION

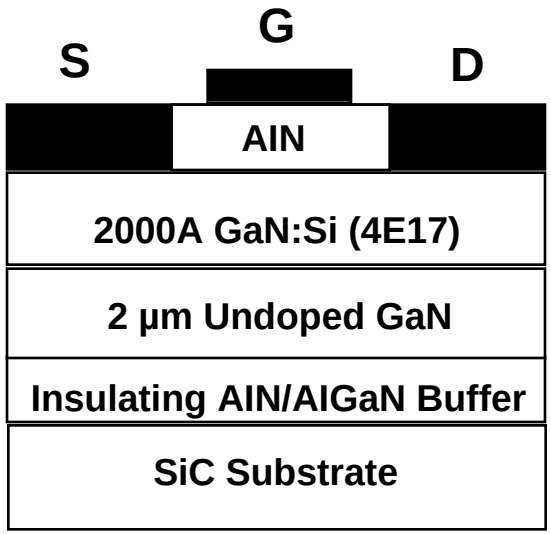
Developed high quality GaN materials that demonstrate great potential for light emitting and electronic devices.

ACCOMPLISHMENTS

- Developed high quality GaN on SiC.
- Developed the growth technology of MIS capacitors and MISFETs on GaN using an insulating AIN epitaxial layer.
- Developed an x-ray simulation program for hexagonal lattice materials.
- ATMI has developed and patented processes that allow the manufacture of high-purity GaN wafers 50mm and larger in diameter.

COMMERCIALIZATION

- GaN epitaxial films on SiC have been made commercially available with the support of the SBIR program.
- Based on recent epitaxy and substrate successes, ATMI has committed significant additional funding for continued GaN wafer development and pilot manufacturing capacity.
- Jointly developing with an industrial partner a high temperature piezoelectric sensor module to measure gas pressure in high temperature engines.
- Several jobs created to support this new technology.



GaN/AlN MISFET Structure on SiC Substrates

GOVERNMENT/SCIENCE APPLICATIONS

- ATMI has recently been awarded contracts totaling nearly $4M from the Office of Naval Research (ONR) and the Ballistic Missile Defense Operation (BMDO) to further develop GaN wafers for electronic and optoelectronic devices.
- GaN materials are key to the development of amplifiers operating at > 350 degrees C. The amplifiers are the basis for various applications not currently accessible using Si-based electronics such as in aircraft engine sensors, and ground-vehicle motor control.

Goddard Space Flight Center

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